

ABSTRACT

A process and apparatus are disclosed for manufacturing high strength low alloy (HSLA) flat rolled steel products having high yield strength and formability. A preferred process comprises the formation of an as-cast product; reducing the thickness of the as cast product in a roughing mill; holding the temperature of the rough-reduced product at a temperature sufficient to permit substantially complete recrystallization of austenite grains in the rough-reduced product; followed by a final reduction step in a hot rolling strip mill. In this process, there is little or no precipitation of microalloy until after the material passes through the strip mill and therefore the material being rolled is relatively soft compared to known processes. Therefore, less power is required to roll the material to its final dimensions, with a corresponding improvement in dimensional control. The material produced according to this process has a strength of at least about 70 ksi, more preferably at least about 80 ksi, and a formability as measured by n-value within the range of from about 0.1 to about 0.15.